Transport Canada Transports Canada

TP 1624

Marine Casualty Investigations

Enquêtes sur les accidents maritimes

Investigation Report to the Minister pursuant to sections 542 or 545 of the Canada Shipping Act

Rapport d'investigation au Ministre conformément aux articles 542 ou 545 de la Loi sur la marine marchande du Canada

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REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES ATTENDING THE PARTIAL LOSS OF A DECK CARGO OF PACKAGED LUMBER FROM THE LIBERIAN MOTOR VESSEL "HARMAC DAWN" IN A NORTH PACIFIC OCEAN STORM ON JANUARY 6, 1986.

REPORT No. 446

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REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES ATTENDING THE PARTIAL LOSS OF A DECK CARGO OF PACKAGED LUMBER FROM THE LIBERIAN MOTOR VESSEL "HARMAC DAWN" IN A NORTH PACIFIC OCEAN STORM ON JANUARY 6, 1986.

Particulars of Vessel

Name	"HARMAC DAWN"
Official Number	6795
Port of Registry	Monrovia
Flag	Liberian
Call Sign	D5ZX
Gross Registered Tonnage	18,258.82
Net Registered Tonnage	12,386.19
Deadweight	31,241.00 tons
L.O.A.	179.60 m
L.B.P.	170.00 m
Breadth	28.00 m
Depth	14.70 m
Designed Draught	10.25 m
Summer Draught	10.369 m
Timber Summer Draught	10.627 m
Freeboard Timber Summer (LS)	4.118 m
Freeboard Timber Winter	4.413 m
Loadline Timber Winter	0.295 m below LS
Built	1980, Japan
Builder	Kanasashi Shipbuilding Co., Toyohashi, Japan
Propulsion	One (1) diesel engine developing 7949 kW and driving a single fixed-pitch propeller

Builder of Engine	Ishikawajima Harima Heavy Industries Co. Ltd., Japan
Number of Decks	One (1)
Classification	B.V.I. 3/3E+, Bulk-Ore Carrier/ Container, Deep Sea & AUT-MS
Owners	Longitude Transport Inc., Monrovia, Liberia
Managers/Operators	Canadian Transport Co. Ltd., Vancouver, British Columbia
Charterers	Canadian Transport Co. Ltd., Vancouver, British Columbia
Local Agents	Port Alberni Shipping Co. Ltd., Port Alberni, British Columbia
Stevedoring Company	Vancouver Island Stevedoring Co. Ltd., Nanaimo, British Columbia

Certificates:

Load Line	B.V. No. 35909, issued in Paris, France, 16 Oct. 1985, expires 25 June 1990
Ship Safety Construction	B.V. No. 370, issued in Paris, France, 16 Oct. 1985, expires 25 June 1990
Ship Safety Equipment	B.V. No. 1280, issued in Paris, France, 19 Jun. 1984, expires 17 May, 1986
Cargo Ship Radiotelegraphy	B.V. No. 2189, issued in Paris, France, 22 Mar. 1985, expires 01 Mar. 1986
International Oil Pollution Prevention	B.V. No. 7131, issued in Paris, France, 13 Sept. 1985, expires 25 Jun. 1990

Navigation Equipment

Radars (3)	Kyoritsu, Model ML-128 (2) in main wheel-house (1) in upper wheel-house
Satnav-Omega	Hokushin-Magnavox HX 1105
D.F.	Koden, Model KS-525 II
Autopilot	Gylot- Tokyo Keidi
Gyro Compass	Kyoritsu
Magnetic Compass	Kyoritsu
Facsimile Recorder	Kyoritsu, Model FXH-872

NOTE: 1) All times in this report are in Pacific Standard Time (UTC minus 8 hours) unless otherwise stated.

2) A glossary of abbrevations and terms may be found following the Findings in this report.

Background

The M.V. "HARMAC DAWN" sailed from Port Alberni on the west coast of Vancouver Island, British Columbia, on January 4, 1986 bound for Tokyo, Japan with a full deck load of packaged lumber.

On January 6, she was caught in a North Pacific storm and at 1545, in position latitude 51°36'N, longitude 139° 15'W, lost part of her deck cargo overboard together with a section of the starboard side bulwarks that had broken away from the deck. Earlier, she had lost a liferaft when it was washed overboard from the after main deck. The approximate value of the lost and damaged lumber was between two hundred thousand and two hundred and fifty thousand dollars.

At 1600, the master decided to return to Port Alberni, restow the cargo and effect temporary repairs to the ship's starboard bulwarks. She berthed at Port Alberni wharf No.2 on January 9, at 0506.

There was no loss of life, no injuries and no pollution following this incident.

Narrative

The "HARMAC DAWN" arrived at Harmac, Vancouver Island, on December 22, 1985 and started loading 4,680 t of pulp. She then shifted to Nanaimo, B.C. on December 24 where she loaded an under-deck cargo of packaged lumber. On December 27, she departed for Crofton, B.C. to complete the under-deck loading. On that same day, the port warden was asked to come aboard by the loading master and a 'Certificate of Readiness to Load' was issued to load approximately 4,300 t of packaged lumber on deck. The vessel arrived in Chemainus, B.C. on December 29 where on-deck loading was commenced. At 2030 hours, December 30, a 'Certificate of Fitness to Proceed' to Port Alberni, was issued by the port warden following the loading of 807 t on Nos. 1, 3 and 4 hatches.

The vessel then sailed for Port Alberni, where she arrived on December 31 and commenced loading on January 2, 1986. By 0900 on January 4, the loading of deck cargo was completed with a total of 7,444 t of packaged lumber stowed on deck to the following heights:

Hatch Nos	Height
Nos. 1,4 and 5	4.27 m (14 ft.)
Nos. 2 & 3	5.49 m (18 ft.)

The port warden issued a 'Certificate of Fitness to Proceed' to Tokyo, Japan, at 1400, January 4, 1986.

The "HARMAC DAWN" departed Port Alberni at 1515 bound for Tokyo, with a total cargo of 22,621 t of lumber, including 7,444 t stowed on deck, and 5,402 t of pulp. Her departure draughts were as follows:

Forward 9.87 m Aft 10.87 m Midship 10.37 m

There were 973 t of ballast water in No.2 double bottom tank which was pressed up. The calculated GM was 0.69 m, while a roll test before departure gave a GM of 1.12 m.

The ship was equipped with a weather facsimile recorder to receive daily weather maps issued by the National Weather Service in San Francisco, California.

The vessel proceeded to sail on a route recommended by a commercial weather routeing service that would have her follow a rhumb line through Unimak Pass, in the Aleutian Islands, coming out of the Bering Sea via Attu Island, where she would proceed to her destination on another rhumb line.

The weather on departure was a moderate easterly/south-easterly gale with winds of Beaufort Scale force 6 to 7 and a moderate to rough sea and swell. The vessel was pitching easily, moderately at times, and was travelling at an average speed of 13.36 knots on a course of 282°T.

For a few hours between 0800 and 2400, January 5, the wind shifted to a south-westerly direction but stayed at about the same strength. The barometer did rise a little during that time from a low of 995, to a high of 1008 mb at 0400, on January 6. The weather was rough with the vessel occasionally shipping seas on the forecastle.

On January 6, from 0400 to 1200, the barometer dropped 32 mb to a low of 976 mb with the winds from the south-east increasing to gale force 8. The following sea became very rough and heavy. At 0925, the steering was switched to manual due to very high seas and speed was reduced to 110 r.p.m. at 1030 with the master ordering various courses in order to keep his vessel from rolling heavily. Full speed on the "HARMAC DAWN" is about 133 r.p.m.

It should be mentioned that chain lashings for the cargo were checked and tightened between 0800 and 0930 on the 5th and 6th.

At noon on the 6th, the vessel's course was adjusted to 350°T to minimize heavy rolling caused by the high seas. The vessel was pitching moderately and shipping seas and spray overall.

At 1330, the 20-man liferaft stowed on the afterdeck was washed overboard; the height of the waves was estimated to be 9 metres (30 ft.); the engine speed remained at 110 r.p.m.

At 1545, three 20 ft. containers and their fittings, two 24 ft sling containers, three yellow bins and bundles of deck cargo on Nos. 1, 2 and 3 hatches, were washed overboard. The starboard side of the bulwarks from hatches 1 to 4 was torn from the deck and part of the deck cargo leaned against the starboard side of the gantry crane leg.

At 1600, the vessel's speed was reduced to 100 r.p.m. (half), a position was fixed and the decision was made by the master to return to Port Alberni to restow the deck cargo; the deviation point was latitude 51°36'N, longitude 139°15'W.

The weather at this time was classified as a southerly storm with winds of force 9 to 10, with confused seas and heavy swell. The height of the waves was reported by the

master to be about 9 metres and the wind to be averaging about 60 knots.

At 1715, the course was steadied on 170°T, the wind southerly, force 11, with high seas and a heavy swell. The steering of the vessel was by hand and engine speed remained at half (100 r.p.m.).

The "HARMAC DAWN" arrived in Port Alberni on the morning of the 9th and was made fast to No.2 dock at 0506. Arrangements were made immediately to start restowing the cargo and repairing the damage. The cargo damage on arrival was as follows:

- on the forward end, starboard side of No.1 hatch, approximately 1/3 to 1/4 of the packaged lumber had fallen overboard, while on the port side the entire load had moved approximately 60 cm to starboard with the side being graduated in a sloping manner;

- Nos. 2 and 3 hatches had the same stepping arrangement with the port side of the deckload progressing inwards as it went up, and some lumber on the starboard side had been washed overboard;

- on top of Nos. 1, 2 and 3 hatches there was a mass of broken bundles of lumber;

- on Nos. 4 and 5 hatches, the lumber which originally was stowed between, but clear of, the gantry crane legs, was now resting against the legs of the crane because the top of the load had shifted over to starboard; and

- the chains and turnbuckles holding the deckload on Nos. 4 and 5 hatches were intact but on Nos. 1, 2 and 3 hatches, most had opened and were hanging over the side of the vessel when it docked in Port Alberni on the morning of the 9th.

No other chains or other lashing gear were found to have come adrift.

Damage to the ship was restricted to the bulwarks on the starboard side where a length of approximately 70 metres had been torn off the deck between hatches Nos. 1 and 4.

The total cargo loss was about 2,350 t, of which 1,260 t was lost at sea, and 1,090 t, though salvaged in Port Alberni, could not be reloaded on board.

There were no injuries or pollution as a result of this incident and at no time did the master feel that his ship was in danger. The vessel did not take any list and remained upright for the duration of the voyage.

The "HARMAC DAWN" departed Port Alberni on January 14 bound for Japan with a total cargo of 25,66[illegible] t, including 5,094 t of packaged lumber on deck.

Analysis

1. History

The "HARMAC DAWN" and the "PORT ALBERNI DAWN" are two sister ships that have been on the B.C. to Japan route since the summer of 1980 carrying deck cargoes of packaged lumber on a regular basis. This was voyage No. 51 and, according to the charterers, the first time that an accident of this nature had occurred. The loading of these two ships has always been carried out by the same stevedoring company.

2. Weather Chart

Weather information in the form of a facsimile surface analysis weather chart was available and was used by the master before departure. The chart of January 4 shows that a string of lows in the North Pacific would most likely bring southeasterly gale force winds to the region.

3. Weather Forecasts

A corrected marine forecast for B.C. coastal waters was issued by Environment Canada at 2245 PST, Friday, January 3, 1986:

> WEST COAST VANCOUVER ISLAND
>
> Gale Warning upgraded to a storm warning for the northern section. Gale warning continued elsewhere. North section .. Winds southeast 30 knots to gales 40 becoming storm force southeast 50 to 60 Saturday morning.
>
> South section .. Winds southeast 15 to 25 knots increasing to southeast 30 to gales 40 Saturday morning. Cloudy.

Outlook ... Gale to storm force southeast winds diminishing..

A marine forecast for B.C. coastal waters was issued by Environment Canada at 1045 PST, Saturday, January 4, 1986.

OFFSHORE

Forecast sea state values are combined wind wave and swell height.

BOWIE

Storm warning continued.
Southeasterly gales 40 to storm force 50 knots diminishing to southerly 20 to 30 this evening. Occasional rain reducing the visibility to 2 miles. Seas 7 to 9 metres subsiding to near 5 tonight.

Outlook - Southeasterly gales

EXPLORER

Gale warning continued

Winds southeasterly 30 to gales 40 knots diminishing to southerly 20 this evening then increasing to southeasterly 30 Sunday morning. Occasional rain reducing the visibility to 2 miles. Seas 4 to 6 metres subsiding to near 4 overnight.

Outlook. Southeasterly gales.

The master was aware of this forecast prior to his departure and the forecast proved correct.

4. **Settling of Deck Cargo**

The Department of Transport issues a leaflet entitled Advice to Masters of Ships Laden with Timber Deck Cargoes, and under the heading Shake Down Period and Compaction the following advice is given:

> Vibration and the working of a ship in a seaway will cause a deck cargo of logs or lumber to settle or compact, especially at the beginning of the voyage.

> Compaction causes the lashings to become slack and be damaged by chafing if the ship rolls from side to side. More important still, the lashings are put under a higher stress when controlling a moving stow. Lashings should be kept taut at all times during the voyage. Masters are advised to ensure that the lashings are checked frequently, particularly during the shake down period. For the first 24 hours it is advisable to tighten all lashings at least once per watch.

The lashing of the deck cargo was completed at 1400 on January 4 and the vessel sailed at 1515. At 1816 the vessel was off Cape Beale steering a course of 282°T in moderate seas and easterly winds of force 6 to 7.

The deck cargo lashings were tightened between 0800 and 0900 on January 5 for the first time and tightened again between 1300 and 1400 on the same day.

By 0800 on January 6, the wind had increased to gale force accompanied by a rough following sea. All the deck cargo lashings were re-tightened by the crew between 0800 and 0930. From the time of sailing until noon (local time) on January 6, a period of 43 hours, the deck cargo lashings had been tightened three times.

It should be noted that within 3 hours of her departure the vessel encountered heavy weather, allowing little time for the cargo to settle and the crew to tighten the lashings. The lashings were subsequently tightened under heavy weather conditions involving some danger to the crew.

5. **Ship Handling in Heavy Weather**

The same leaflet as referred to in element 4 of this analysis section, under the heading Ship Handling in Heavy Weather, states:

> On several occasions deck cargo has been lost by a Master driving his vessel at high speed through heavy weather. Some losses were due to inadequate protection by the forecastle of the forward outboard corners of the stow; others were caused by heavy seas breaking on board. The lashings required by the Regulations are not intended to provide a means of securing against imprudent ship handling in heavy weather. There can be no substitute for

good seamanship. The impact of heavy seas breaking on board should be reduced whenever possible. This may be done by reducing speed or altering course.

The engine speed table posted beside the wheel-house engine controls shows:

R.P.M.	KNOTS
91	11
99	12
108	13
116	14
124	15
133	16

From departure until 1030 on January 6th, the ship was sailing at full speed at an average sea speed of 12.88 knots.

At 1030 on the 6th, the master reduced the r.p.m. to 110 and tried to steer various courses to minimize the heavy rolling and pitching. The vessel was reportedly rolling up to 20° at this time. At noon, the course was adjusted to 350°T. At 1330, the liferaft stowed on the after main deck, was washed overboard. At 1545, part of the deck load was lost and at 1600, the r.p.m. were further reduced to 100 (half speed).

From the noon position to the 1600 position, the vessel travelled 49 nautical miles, averaging a speed made good of 12.25 knots. According to the engine speed table, the sea speed for 110 r.p.m. is 13.25 knots; the difference can be accounted for by the heavy rolling and pitching of the vessel.

At 1600, after having lost her liferaft and part of her deck cargo, the master reduced the speed of the vessel from 110 r.p.m. to 100 r.p.m., an approximate reduction of 1 knot in the ship's speed. The course was then changed to 170°T, heading back to Port Alberni. With the vessel now heading into the storm, the weather conditions were logged as stormy with high and heavy seas and confused, heavy swell. There is no report of any further loss of cargo, even though about two thirds of the cargo still remained unlashed on the forward half of the deck.

6. Stability

The Timber Cargo Regulations, Part I, article 5 (1) state:

> The cargo shall be compactly stowed, lashed and secured; it shall not interfere in any way with the navigation and necessary working of the ship or with the provision of a safe margin of stability at all stages of the voyage, taking into account additions of weight such as those due to absorption of water and to losses of weight such as those due to consumption of fuel and stores.

The Canadian Code of Safe Practice for Ships Carrying Timber Deck Cargoes published by Transport Canada (TP 2534), under section 7, STABILITY, article 7.3 states:

> The Master should establish or verify the stability of his vessel for the worst service condition having regard to the increased weight of deck cargo due to water absorption and/or ice accretion and to variations in consumables. It should be kept in mind that excessive stability might cause more severe force on the lashings in heavy seas.

On the "HARMAC DAWN" no stability data was produced for the worst conditions of the voyage. Because of draft restrictions in certain Japanese ports, considerably more attention was paid to the vessel's 'trim after unloading' at the various ports. The chief mate updated the 'departure condition' stability report as the work progressed and consulted the loading master as to the amount of cargo that was coming on board. The departure condition for the "HARMAC DAWN" on January 4, 1986 gave a calculated GM of 0.69 m, allowing for free surface movements in the fuel and fresh water tanks.

After all cargo was loaded and with the ship in her departure condition, the loading master conducted a rolling period test in order to arrive at an approximate GM for the vessel. The test is conducted in the following manner:

> A load of lumber, usually 4 packages, is placed by the shore crane on one side of the vessel; all lines from the ship to the shore are slackened and the load is lifted, causing

> the vessel to roll. The loading master and the chief mate measure the time taken for the ship to complete an entire oscillation and from this an approximate metacentric height can then be calculated.

The weather was calm with only light airs and the GM arrived at was 1.12 m with a rolling period of 21 seconds.

The discrepancy of 0.43 m between the calculated GM and the 'tested' GM could not be accounted for. The chief officer's departure calculations appear to be correct and it is not possible to re-check the roll test as it was made on an informal basis and no useful working record was kept.

The master reported that the vessel was riding comfortably while at sea and that her stability was excellent, being neither too stiff nor too tender.

7. Stowage

The cargo was loaded in a fore and aft direction on the forward and after part of No. 1 and No. 5 hatches respectively. In between, the cargo was stowed with the bottom tier fore and aft; the next tier athwartship; the next one fore and aft, etc., always keeping the bottom and top in a fore and aft direction. This form of loading was found to be the most effective for packaged timber deck cargoes, providing for a more uniform and compact deck load.

Annex 'A', of the Code of Safe Practice for Ships Carrying Timber Deck Cargoes, states in the opening paragraph:

> The primary requirement for the safe carriage of any timber deck cargo is a solid, compact stowage during all stages of the deck loading. This can only be achieved by constant supervision by ship's personnel during loading and insistence that the cargo be compacted and stowed rather than stacked.

The loading of the deck cargo was the responsibility of the loading master, with the chief mate examining the loading plan as presented to him by the loading master and paying particular attention to the final trim in the various ports of discharge.

Section 1.7 of the same Annex states:

> Due to the system of athwartship lashing, the stowage of packages should generally be in the fore and aft direction. This is not always possible and some athwartship stowage cannot be avoided due to the necessity of blocking out where the stow is broken by deck structures. Excluding the wings of the two topmost tiers and the outboard packages of the stow, it is advisable to have one or more non-adjacent tiers stowed athwartship when above the level of the hatches to produce a binding effect within the cargo. When practical, it is recommended that at least two athwartship lashings secure each package at the side vertical faces of the stow. If necessary, when a tier has been stowed athwartship, the outboard edge of the tier may be secured by laying a line of packages in the fore and aft direction.

In this instance, the vessel was purposely loaded with some athwartship stowage between No. 1 and No. 5 hatches as it has been found, through experience, to make a more compact and solid stow. In this respect a memorandum, dated March 7, 1980, which was sent to all port wardens by the Acting Chief, Nautical Services, stated:

> As a result of experimental voyages on the West Coast, it has been found that a locking 'brick' stow of packaged lumber may offer advantages over the traditional fore and aft stowage methods.
>
> Use of this method of stowage comprising alternate tiers of packages stowed fore and aft and athwartship may be permitted provided at least the top two tiers of the cargo are stowed fore and aft and each package is secured by at least two lashings.
>
> In order to obtain the full advantage of this stow, packages stowed athwartship should extend to the outboard edge of the cargo block and not be walled off by fore and aft stowage of outboard packages.
>
> Packages having lumber in random lengths should be adequately blocked or bridged to ensure a compact stow is achieved.

On the "HARMAC DAWN" loose timber was used to fill any gaps.

It is acknowledged that it is difficult to achieve a good solid stow of packaged lumber.

8. **Uprights**

Section 2.5 of the Code of Safe Practice for Ships Carrying Timber Deck Cargoes states:

> Uprights, when required by the nature or height of the timber, should be of adequate strength which should not exceed the strength of the bulwark and the spacing should be suitable for the length and character of the timber carried, but should not exceed 3 metres. Strong angles or metal sockets or equally efficient means should be provided for securing the uprights. Where suitable, permanent ship's structure may be used as uprights.

Ship Safety Bulletin No.16/84 (see Annex) requires the fitting of uprights, when:

a) the height of the timber above the weather deck or hatch cover exceeds 1.83 metres; and

b) the vessel is loading its timber in a port located within the seasonal winter loadline zone during the period in which the winter loadline is applicable.

In the present case, the height of the timber above the weather deck exceeded 1.83 m (averaging 5 m) and although her planned route from Vancouver to Tokyo along a 'great circle' track would take the "HARMAC DAWN" into a winter zone for most of her voyage, uprights were not fitted. The vessel loaded in a summer zone port but the loss of cargo did occur in the seasonal winter zone during the winter season.

In way of No. 5 hatch, where the crane legs had acted, albeit inadvertently, as uprights, the cargo stow was significantly less disturbed.

9. **Lashings**

Lashings were spaced 1.5 m apart on Nos. 2, 3 and 4

hatches and were doubled up (spaced 0.75 m) on No. 1 and No. 5 hatches.

Section 5.2 of the Code of Safe Practice for Ships Carrying Timber Deck Cargoes specifies:

> The spacing of the lashing should be determined by the maximum height of the cargo above the weather deck in the vicinity of the lashing:
>
> a) for a height of 4 metres (13 feet) and below the spacing should be 3 metres (9.8 feet);
>
> b) for a height of 6 metres (19.6 feet) and above the spacing should be 1.5 metres (4.9 feet);
>
> c) at intermediate heights the average spacing should be obtained by linear interpolation.

Thus the spacing of the timber deck cargo lashings on the "HARMAC DAWN" was in conformity with the Code, and the Code's lashing requirements were exceeded at the ends of the stow.

Part I of the Timber Cargo Regulations states under section 8(1):

> A complete system of overall lashings of ample strength and in good condition, fitted with releasing arrangements, shall be provided so as to give effective security throughout the length of the cargo; the releasing arrangements shall be accessible at all times; all fittings required for securing lashings shall be of strength corresponding to the strength of the lashings.

For lashings to give effective security throughout the length of the cargo, the slip hooks used must be moused. This is because of their unsatisfactory design in that they have straight tongues with the result that tension on the lashings tends to force the securing rings into the release position and a slight jar on the fittings may release them.

When the "HARMAC DAWN" docked in Port Alberni, the chains from the middle of No. 1 hatch to the after end of No. 3 hatch were hanging unbroken from the ship's

side. On inspection of the other intact chains and slip hooks, it was found that, although the majority of the securing rings were moused, some were not, and also, all the slip hooks that were considered as part of the lashings had straight tongues.

As long ago as 1949, there has been concern regarding the shape of tongues on slip hooks and the mousing of the securing rings. This concern has been expressed by the issuance of notices warning ship masters of problems with these appliances.

There is a very strong possibility that heavy seas breaking on deck could cause the deck cargo to move, momentarily slackening off the chains and allowing the securing rings, if they were not moused, to slip, or if they were moused, to break their mousings and work their way into tne release position.

10. **Port Warden**

Subsection 614 (3) of the Canada Shipping Act requires that:

> The master or agent of any ship intending to load a timber deck cargo consigned to any place outside Canada and not being a place within the limits of an inland voyage shall, subject to subsection 434(5), before commencing to load, notify the port warden, or, at places where there is no port warden, the authorized surveyor who shall supervise the loading and on completion shall issue a certificate that the regulations in this respect have been complied with, recording all particulars in his book relative to stowage, quantities of cargo on deck and below, method of securing, height of deck loads at wings and crown on forward and after decks, with amount of water ballast carried and draft of water with corresponding freeboard.

Subsection 434 (4) of the Canada Shipping Act requires that:

> Where a Load Line ship is about to make a voyage carrying a deck cargo of timber from Canada, the owner or master shall have the ship inspected by a port warden, or other person directed thereto in writing by the Minister, who shall if he is satisfied that he

> can do so with propriety, give a certificate showing that such ship is suitable for the carriage of deck cargoes of timber, and that such cargo is properly stowed and secured in accordance with the timber cargo regulations.

Before the timber loading was commenced on deck, the loading master advised the port warden based in Nanaimo who came on board to inspect the chains, turnbuckles, shackles, etc. and saw their certificate of test (Form T.4); he also checked the approximate amount and type of timber to be loaded. He then issued a Certificate of Readiness to Load.

After loading 807 t of packaged lumber on deck, the vessel was allowed to sail to Port Alberni where she completed her deck load. The loading master then called the port warden on January 3 and requested him to board the vessel after lunch on January 4. At 1300 on January 4 the port warden boarded the ship and all lashings were checked, causing some to be retightened. A Certificate of Fitness to Proceed was issued at 1400 on January 4.

11. Experience of Personnel

The master of the "HARMAC DAWN" holds a Master Ocean-going certificate of competency issued in Monrovia, Liberia and has 30 years sea experience. He has sailed as master since 1970 on various dry cargo vessels and bulk carriers. He has sailed many years on the North Atlantic run between Canada and Europe, during which time he occasionally carried deck cargoes. This was his fifth trip as relief master on the "HARMAC DAWN".

The chief officer holds a Chief Mate certificate of competency issued in Monrovia, Liberia and has 15 years sea experience. He has served on this vessel for 2 years as 2nd mate and has been chief officer for 14 months.

The loading master holds a second mate Foreign-going certificate of competency issued in Japan in 1969. He has 3 years sea-going experience as a deck officer and 14 years experience ashore loading vessels including 3 years with a major international carrier as Master Ship Planner. He has been with his present employer for one year.

The function of port warden was performed at Namaimo by a senior officer of the Ship Safety Branch of the Canadian Coast Guard. At Port Alberni the position of port warden is a fees-of-office appointment under the

Canada Shipping Act. The deputy port warden at Port Alberni who attended the "HARMAC DAWN" had been performing that function for three and a half years and had no sea-going experience.

Findings

It appears that the following factors contributed to the loss overboard of part of the deck cargo of packaged lumber from the M.V. "HARMAC DAWN" in a storm in the North Pacific Ocean on January 6, 1986:

- excessive speed in heavy weather;
- the difficulty of tightening the lashings after the timber deck cargo had settled, due to heavy weather conditions;
- with slack lashings many slip-hooks became disengaged, some not having been moused, releasing the lashings;
- the straight tongue of the slip hooks, commonly used, facilitates the accidental release of the lashing; and
- the deck cargo, being stowed on the hatches, had no upright or solid ship side structure for support.

Other Findings:

The steering of various courses to minimise the rolling was ineffective.

The vessel sailed into the winter seasonal zone with timber deck cargo loaded in accordance with the established practice for a summer seasonal zone port.

OTTAWA, ONTARIO
NOVEMBER, 1986.

Glossary

AUT-MS	automated machinery space
Beaufort Scale	A numerical scale, rating winds according to ascending velocity, as: force 6 strong breeze 22-27 knots force 7 near gale 28-33 knots force 8 gale 34-40 knots force 9 strong gale 41-47 knots force 10 storm 48-55 knots force 11 violent storm 56-63 knots
Bulwarks	the upper section of the frames and side plating which extends above and around the upper deck.
BV	Bureau Veritas
Great Circle	the intersection of a sphere and a plane through its centre. (The track along a great circle represents the shortest distance between two points but requires continual alteration of course by a vessel following it).
'Great Circle'	the track which the "HAMAC DAWN" intended to follow was not a true great circle. However that composite rhumb line route through higher latitudes approximated the form of a great circle as represented on a Mercator chart.
LBP	length between perpendiculars
LOA	length overall
mb	millibars
to mouse	to bind a small piece of cord or wire across a hook to prevent its unhooking.
Rhumb Line	a line on the earth's surface which cuts all the meridians at the same angle. (This represents the track of a vessel on one course from origin to destination).

Slip Hook	a long-shank, hinged hook with a link over the beak (tongue).. When the link is knocked off, the hook collapses. Also called a pelican hook.
t	tonne, (1000 kg)

ANNEX

Ship Safety Bulletin 16/84

16/84

October 16, 1984

TIMBER DECK CARGOES - FITTING OF UPRIGHTS

Sections 9 and 13 of the Timber Cargo Regulations specify that uprights shall be fitted when required by the nature of the cargo.

Investigations of casualties on ships loaded with timber deck cargoes have revealed that one of the contributing or proximate cause of such incidents was that uprights were either not installed or improperly fitted.

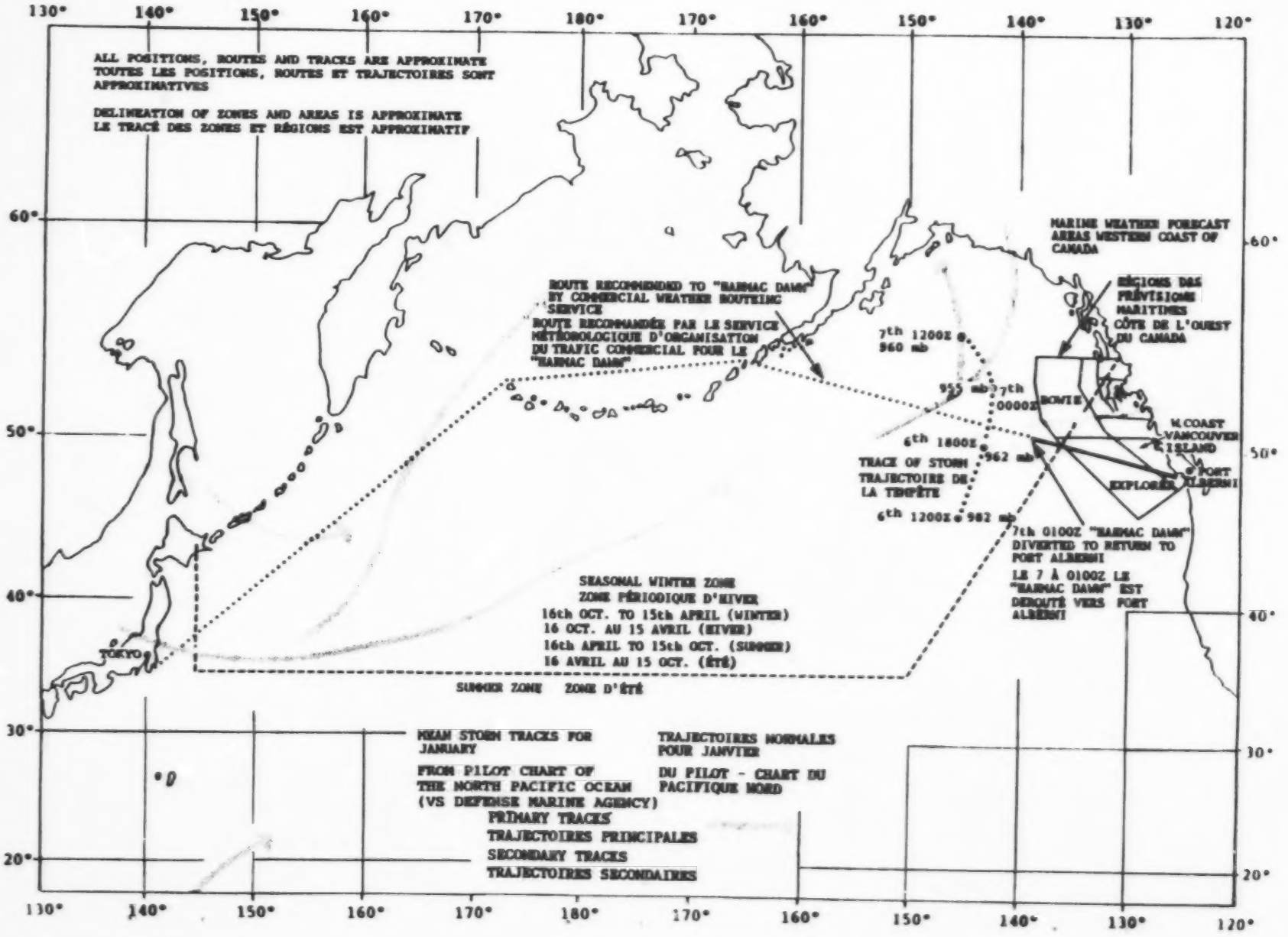
The Board of Steamship Inspection, in reviewing the circumstances, has decided that uprights shall now be fitted as described in the "Code of Safe Practice for Ships Carrying Timber Deck Cargoes", when:

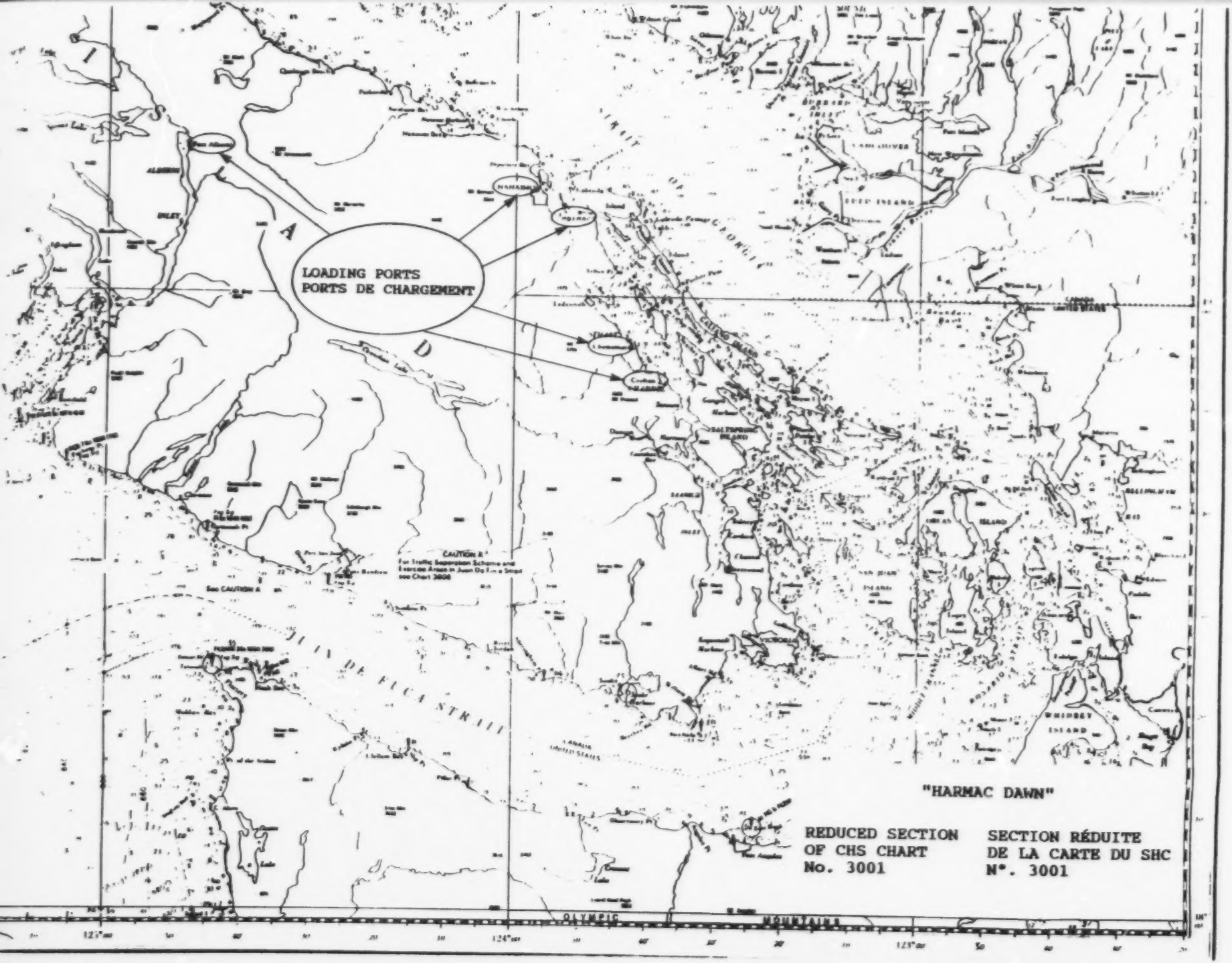
a) the height of the timber above the weather deck or hatch cover exceeds 1.83 meters; and

b) the vessel is loading its timber in a port located within the seasonal winter loadline zone during the period in which the winter loadline is applicable.

In other circumstances, the decision as to whether the nature of the cargo requires the fitting of uprights, remains with the port warden.

CGSO-C/M


ALL POSITIONS, ROUTES AND TRACKS ARE APPROXIMATE
TOUTES LES POSITIONS, ROUTES ET TRAJECTOIRES SONT APPROXIMATIVES
DELINEATION OF ZONES AND AREAS IS APPROXIMATE
LE TRACÉ DES ZONES ET RÉGIONS EST APPROXIMATIF
ROUTE RECOMMENDED TO "BARMAC DAWN" BY COMMERCIAL WEATHER ROUTEING SERVICE
ROUTE RECOMMANDÉE PAR LE SERVICE MÉTÉOROLOGIQUE D'ORGANISATION DU TRAFIC COMMERCIAL POUR LE "BARMAC DAWN"
7th 1200Z 960 mb
955 mb
7th 0000Z
6th 1800Z
962 mb
TRACE OF STORM
TRAJECTOIRE DE LA TEMPÊTE
6th 1200Z 982 mb
BOWIE
M. COAST
VANCOUVER ISLAND
PORT ALBERNI
EXPLORER
7th 0100Z "BARMAC DAWN" DIVERTED TO RETURN TO PORT ALBERNI
LE 7 À 0100Z LE "BARMAC DAWN" EST DÉROUTÉ VERS PORT ALBERNI
MARINE WEATHER FORECAST AREAS WESTERN COAST OF CANADA
RÉGIONS DES PRÉVISIONS MARITIMES CÔTE DE L'OUEST DU CANADA
SEASONAL WINTER ZONE
ZONE PÉRIODIQUE D'HIVER
16th OCT. TO 15th APRIL (WINTER)
16 OCT. AU 15 AVRIL (HIVER)
16th APRIL TO 15th OCT. (SUMMER)
16 AVRIL AU 15 OCT. (ÉTÉ)
SUMMER ZONE ZONE D'ÉTÉ
TOKYO
MEAN STORM TRACKS FOR JANUARY
FROM PILOT CHART OF THE NORTH PACIFIC OCEAN (VS DEFENSE MARINE AGENCY)
TRAJECTOIRES NORMALES POUR JANVIER
DU PILOT - CHART DU PACIFIQUE NORD
PRIMARY TRACKS
TRAJECTOIRES PRINCIPALES
SECONDARY TRACKS
TRAJECTOIRES SECONDAIRES
130° 140° 150° 160° 170° 180° 170° 160° 150° 140° 130° 120°
60° 50° 40° 30° 20°


LOADING PORTS
PORTS DE CHARGEMENT
A
D
JUAN DE FUCA STRAIT
OLYMPIC
MOUNTAINS
"HARMAC DAWN"
REDUCED SECTION
OF CHS CHART
No. 3001
SECTION RÉDUITE
DE LA CARTE DU SHC
N°. 3001

DECK CARGO BEFORE
DEPARTURE JANUARY 4, 1986

PONTÉE AVANT LE DÉPART,
LE 4 JANVIER 1986

VIEWS OF PORT SIDE -
STARBOARD SIDE SIMILAR

VUE DU CÔTÉ BÂBORD -
CÔTÉ TRIBORD SEMBLABLE

DECK CARGO ON VESSEL'S RETURN
TO PORT ALBERNI

PONTÉE AU RETOUR DU
NAVIRE À PORT ALBERNI

PORT SIDE CÔTÉ BÂBORD

VIEW FROM FORWARD
VUE DE L'AVANT

NOTE: BROKEN AND
SHIFTED PACKAGES

À REMARQUER: BRISURE ET
DÉSARRIMAGE DE PAQUETS

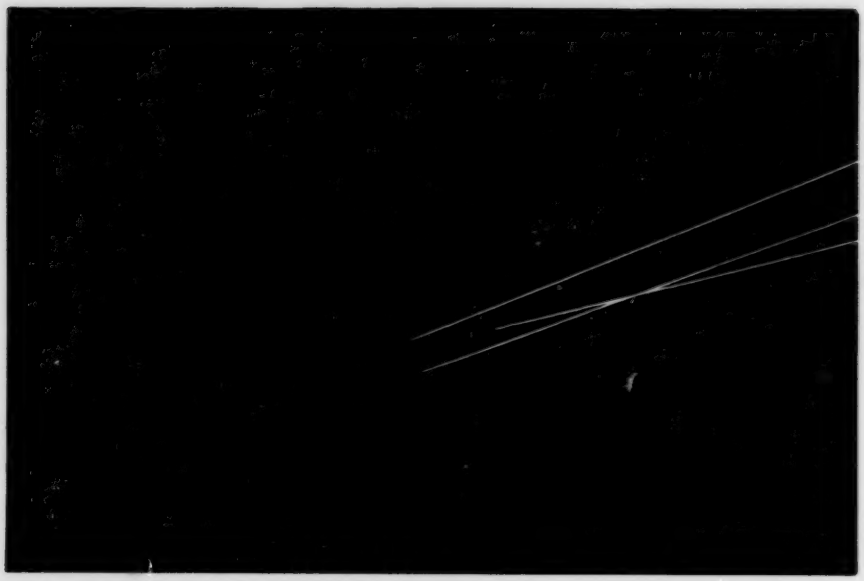
VIEW FROM AFT.
VUE DE L'ARRIÈRE

VIEWS OF STARBOARD SIDE ON VESSEL'S RETURN

VUE DU CÔTÉ TRIBORD AU RETOUR DU NAVIRE

NOTE MISSING SECTION OF BULWARK

À REMARQUER: SECTION MANQUANTE DU PAVOIS



SLIP HOOKS AS USED ON "HARMAC DAWN" LASHINGS

CROCS À ÉCHAPPEMENT DE L'AMARRAGE UTILISES SUR LE "HARMAC DAWN"

NOTE: STRAIGHT TONGUES

À REMARQUER: POINTE DES CROCS EST DROITE